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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,407	12/15/2000	Benedict G. Pace	NH-07a	8815
7590 07/12/2005			EXAMINER	
John F McCormack 116 Milburn Lane Roslyn Heights, NY 11577			GUERRERO, MARIA F	
			ART UNIT	PAPER NUMBER
			2822	
DATE MAILED: 07/12/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/737,407

Applicant(s)

PACE, BENEDICT G.

Examiner

Maria Guerrero

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-38 is/are pending in the application.
- 4a) Of the above claim(s) 25-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to the Request for continued examination and the amendment filed June 20, 2005.

Status of Claims

2. Claims 1-15 are canceled. Claims 16-38 are pending.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 20, 2005 has been entered.

Election/Restrictions

4. Re-submitted claims 25-38 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claims require a specific way to deposit the metal and packaging on a ceramic base.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 25-38 are withdrawn from consideration

as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 16 and 19-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood et al. (U.S. 3,663,184).

Wood et al. teaches providing an insulating substrate having metallic pads, depositing a metal over the metallic pads (Fig. 1a-1d, col. 3, lines 14-60). Wood et al. discloses the bumps comprising a metal having a melting point over 350°C and below the melting point of the metal forming the metallic pads (inherent) (col. 2, lines 10-15). Wood et al. teaches melting a metal on the metallic pads to form metal bumps (col. 2, lines 12-15). Furthermore, Wood et al. discloses the metallic pads having refractory metals and the bumps having gold (Fig. 2d, col. 2, lines 20-27, col. 3, lines 5-10). Wood et al. teaches the use of copper as conventional in the art (col. 3, lines 67-70). Wood et al. describes the substrate being silicon that is capable of withstanding processing over 350°C.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (U.S. 3,663,184) in view of Yamaji et al. (U.S. 6,159,837).

Regarding claims 17-18, Wood et al. does not specifically show the metal being in a powdered form and being deposited by screen-printing. However, Yamaji et al. teaches depositing the metal by screen-printing in a powdered form (col. 4, lines 20-25, col. 6, lines 3-12).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include the conventional step of depositing the metal by screen-printing in a powdered form in Wood et al. reference as taught Yamaji et al. The modification would provide a highly reliable semiconductor device with reduce thermal stress (Yamaji et al., Abstract).

7. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (U.S. 3,663,184) in view of Kondo et al. (U.S. 5,656,858).

Regarding claims 23-24, Wood et al. does not specifically show coating the bumps with a barrier metal and the using a solder aid to enhance solderability. However, Kondo et al. teaches the bump being cover with a wiring pattern and being

Art Unit: 2822

solder in order to be electrically connected to an external substrate (Fig. 1, col. 3, lines 40-45).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Wood et al. reference by including Kondo et al. teaching. The modification is proper because Wood et al. suggested the step of bonding to support substrates (col. 2, lines 54-58).

Response to Arguments

8. Applicant's arguments filed December 22, 2003 have been fully considered but they are not persuasive. Claims 16-24 stand rejected.

Applicant argued that Wood et al. shows that the bumps melt in the range of 182.8 °C to 329.4°C and Applicant's claim 16 and dependent claims 17-24 teach the formation of solderable metal bumps by melting a metal having a melting point over 350°C. First, it is agreed that Wood et al. shows that the bumps melt in the range of 182.8 °C to 329.4°C. Second, claim 16 recites depositing a metal having a melting point over 350°C; melting the metal, forming metal bumps on the metallic pads. Third, Wood et al. shows depositing a metal on the substrate over the metallic pads, the metal having a metal point over 350°C., i.e., gold, and below the melting point of the metal forming the metallic pads, i.e. nickel (inherent) (Fig. 2d, col. 2, lines 20-27, col. 3, lines 5-10). In addition, CRC Handbook of Chemistry and Physics (of record) is cited as evidence to show that the metal forming the bumps on Wood et al. have a lower melting point than the metallic pads. CRC Handbook of Chemistry and Physics (of record) is

cited as evidence to show that the substrate disclosed by Wood et al. is capable of withstanding processing over 350°C.

9. Applicant argued that the gold layer on Wood et al. does not constitute a bump. However, the claims do not recite that the bumps being formed by a single metal. Claim 16 recites forming metal bumps on the metallic pads and Wood et al. anticipated that limitation because Wood et al. described gold or copper as well known solder bump materials (Fig. 2d, col. 2, lines 20-27, col. 3, lines 5-10, col. 3, lines 60-70).

10. Furthermore, the elements must be arranged as required by the claim, but this is not an *ipse dixit* test, i.e., identity of terminology is not required. In *re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure at the time of invention, but only that the subject matter is in fact inherent in the prior art reference. *Schering Corp. v. Geneva Pharm. Inc.*, 339 F.3d 1373, 1377, 67 USPQ2d 1664, 1668 (Fed. Cir. 2003). *Toro Co. v. Deere & Co.*, 355 F.3d 1313, 1320, 69 USPQ2d 1584, 1590 (Fed. Cir. 2004).

11. In addition, during patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." In *re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. In *re American Academy of Science Tech Center*, F.3d, 2004

WL 1067528 (Fed. Cir. May 13, 2004)(The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation.) < This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) >; *Chef America, Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir. 2004).

12. Regarding the limitation "the substrate being capable of withstanding processing over 350°C", a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963).

13. Furthermore, "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*,

874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989). See also *Celeritas Technologies Ltd. v. Rockwell International Corp.*, 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir.1998).

14. In addition, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). >"When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001). See also MPEP § 2131.02.

15. Finally, the transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., > *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003) ("The transition comprising' in a method claim indicates that the claim is open-ended and allows for additional steps."); < *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.); *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); *In re Baxter*, 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981); *Ex parte Davis*, 80 USPQ 448, 450

(Bd. App. 1948) ("comprising" leaves "the claim open for the inclusion of unspecified ingredients even in major amounts").

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. CRC Handbook of Chemistry and Physics (of record) is cited as evidence to show that the metal forming the bumps on Wood et al. have a lower melting point than the metallic pads. CRC Handbook of Chemistry and Physics is cited as evidence to show that the substrate disclosed by Wood et al. is capable of withstanding processing over 350°C.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2822

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

July 6, 2005

Maria Guerrero
MARIA F. GUERRERO
PRIMARY EXAMINER